

December 5th-8th, 2022, Gdańsk

## PROGRAMME

**Place:** Institute of Informatics, Faculty of Mathematics, Physics and Computer Science, University of Gdańsk, Wita Stwosza 57, Gdańsk, lecture room no. 1.15

### Monday, December 5th, 2022

16:00 – 19:30 Registration

17:00 – 17:10 **Official opening by Piotr Bojarski – Dean of the Faculty of Mathematics, Physics and Computer Science**

17:10 – 18:00 **Keynote speaker: Marek Żukowski\***

*2022, Nobel Prize for our branch of physics. Why these three?  
Historical remarks, and personal memories from 1990s.*

18:00 – 18:50 **Keynote speaker: Stephen Walborn\***

*Photonic quantum information processing with multi-core optical fibers*

19:00 - Welcome reception & Discussion time

\* Open talks broadcast via Zoom <https://zoom.us/j/95792394930?pwd=OEkwSlgyRGltbVRrcXhhNkd0T01lQT09>  
(Meeting ID: 957 9239 4930, Passcode: k6MrxK)

### Tuesday, December 6th, 2022

10:00 – 10:30 **SpeedTalks I**

Luis Cort-Barrada (ICTQT, UG)  
Ana Belen Sainz (ICTQT, UG)  
Jan Tuziemski (CTP, PAS)  
Albert Rico (WFAiI, UJ)  
Paweł Cieśliński (WMFiI, UG)

Konrad Schlichtholz (ICTQT, UG)  
Antonio Mandarinò (ICTQT, UG)  
Otavio Molitor (ICTQT, UG)  
Aravindh Balaji Ravichandran (ICTQT, UG)

Break & Discussion time

10:45 – 11:15 **SpeedTalks II**

Michał Parniak (QOT, UW)  
Bartosz Niewelt (QOT, UW)  
Fattah Sakuldee (ICTQT, UG)  
Marco Erba (ICTQT, UG)  
Tushita Prasad (ICTQT, UG)

Gerardo Suarez (ICTQT, UG)  
Moises Bermejo Moran (WFAiI, UJ)  
Stanisław Kurzyna (QOT, UW)  
Saeid Izadshenas (WFAiI, NCU)

Break & Discussion time

11:30 – 12:00 **SpeedTalks III**

Marcin Markiewicz (ICTQT, UG)  
Mathias Salzger (ICTQT, UG)  
Tomasz Linowski (ICTQT, UG)  
Marcin Karczewski (ICTQT, UG)  
Vinicius Pretti Rossi (ICTQT, UG)

Moein Naseri (QOT, UW)  
Maciej Demianowicz (GUT)  
Chithra Raj (ICTQT, UG)  
Pedro Dieguez (ICTQT, UG)

Lunch Break

15:00 – 18:00 **Tuesday Poster Session**

## Wednesday, December 7th, 2022

10:00 – 10:30

### SpeedTalks IV

**Marcin Marciniak** (WMFiI, UG)  
**Jan Nowosielski** (QOT, UW)  
**Daniel McNulty** (CTP, PAS)  
**Artur Czerwiński** (WFAiI, NCU)  
**Julia Chupryna** (WFAiI, NCU)

**Michał Cholewiak** (WMFiI, UG)  
**Marcin Jastrzębski** (QOT, UW)  
**Karol Łukanowski** (QOT, UW)  
**Akshata Shenoy** (ICTQT, UG)

Break & Discussion time

10:45 – 11:15

### SpeedTalks V

**Kaushik Joarder** (WFAiI, NCU)  
**Borhan Ahmadi** (ICTQT, UG)  
**Susane Celegari** (CTP, PAS)  
**Sumit Rout** (ICTQT, UG)  
**Marek Winczewski** (ICTQT, UG)

**Paweł Mazurek** (ICTQT, UG)  
**Michał Banacki** (ICTQT, UG)  
**Wojciech Bruzda** (WFAiI, UJ)  
**Divyansh Mangal** (ICTQT, UG)

Break & Discussion time

11:30 – 12:00

### SpeedTalks VI

**Marcin Pawłowski** (ICTQT, UG)  
**Marcus Grassl** (ICTQT, UG)  
**Marcin Łobejko** (ICTQT, UG)  
**Karthi Hosapete Seshadri** (ICTQT, UG)  
**Giuseppe Viola** (ICTQT, UG)

**John Selby** (ICTQT, UG)  
**Saronath Halder** (QOT, UW)  
**Piotr Mironowicz** (ICTQT, UG)  
**Paulo Cavalcanti** (ICTQT, UG)  
**Marcin Wieśniak** (ICTQT, UG)

Lunch Break

15:00 – 18:00

### Wednesday Poster Session

## Thursday, December 8th, 2022

9:00 – 11:00

### Broadcast of the Nobel Lecture

11:00 – 11:30

### Closing remarks

11:30 –

### Farewell coffee

## Acronyms

**UG** – University of Gdańsk

**ICTQT** – International Centre for Theory of Quantum Technologies

**WMFiI** – Faculty of Mathematics, Physics and Computer Science

**UW** – University of Warsaw

**QOT** – Centre for Quantum Optical Technologies, Centre of New Technologies

**UJ** – Jagiellonian University

**NCU** – Nicolas Copernicus University in Toruń

**WFAiI** - Faculty of Physics, Astronomy and Informatics,

**PG** – Gdańsk University of Technology

**CTP PAS** – Center for Theoretical Physics, Polish Academy of Sciences

**KCIK** – National Quantum Information Centre

## List of speed talks / poster sessions

| Tuesday Poster Session       |   |
|------------------------------|---|
| Albert Rico                  | Multilinear entanglement detection from $\mathbb{C}S_n$   |
| Ana Belen Sainz              | An open-source linear program for testing nonclassicality   |
| Antonio Mandarino            | Quantum phase detection generalisation from marginal quantum neural network models                                  |
| Aravindh Balaji Ravichandran | Photonic encoding of qubits using W state encoding  |
| Bartosz Niewelt              | Optimization of the performance of quantum memory by tuning external magnetic fields                                |
| Chithra Raj                  | On the Quantum Monogamy Bounds from Information Causality   |
| Fattah Sakuldee              | Suppression of Displacement Noise and Recovery of Superresolution in Displacement Measurement                       |
| Gerardo Suarez               | Optimal control of charging quantum batteries   |
| Jan Tuziemski                | Efficient Learning of Readout Noise Cross-Talk Models in Near-Term Quantum Devices                                  |
| Konrad Schlichtholz          | Contextuality of bosonic fields in states with undefined particle numbers   |
| Luis Cort-Barrada            | Effect of non-markovian bath to the dynamics of the qubit-cavity hybrid   |
| Maciej Demianowicz           | Genuinely entangled subspaces   |
| Marcin Karczewski            | Heralded entanglement via bosonic subtraction   |
| Marcin Markiewicz            | Duality of averaging of quantum states over arbitrary symmetry groups.  |
| Marco Erba                   | Classical theories with entanglement and generalised noncontextuality   |
| Matthias Salzger             | Connecting indefinite causal order processes to composable quantum protocols in a spacetime                         |
| Michał Parniak               | Spectral superresolution achieved using a quantum memory  |
| Moein Naseri                 | Speed Limit for the Change of Basis   |
| Moises Bermejo Moran         | Overlapping Bell Inequalities   |
| Otavio Molitor               | Salient signatures of entanglement in the surrounding environment   |
| Paweł Cieśliński             | Reliable Entanglement Verification with Finite Copies of a Quantum State  |
| Pedro Dieguez                | Thermal devices powered by generalized measurements with indefinite causal order                                    |
| Saeid Izadshenas             | Broadband metasurface for Raman spectroscopy beyond single molecule detection level                                 |
| Stanisław Kurzyrna           | Storage of light in gradient echo memory  |
| Tomasz Linowski              | Application range of crosstalk-affected spatial demultiplexing for resolving separations between unbalanced sources |
| Tushita Prasad               | $1/n$ expansion of the regularised coherent information of a noisy quantum channel                                  |
| Vinicius Pretti Rossi        | Contextuality with vanishing coherence and maximal robustness to dephasing  |

| Wednesday Poster Session |   |
|--------------------------|---|
| Akshata Shenoy           | Practical Quantum Key Distribution Onboard Satellites                                     |
| Artur Czerwinski         | Quantum tomography of time-bin entangled photon pairs                                     |
| Borhan Ahmad             | Catalysis in charging quantum batteries   |
| Daniel McNulty           | Estimating Quantum Hamiltonians via Joint Measurements of Noisy Non-Commuting Observables |
| Divyansh Mangal          | Self-Testing Device-Independent Quantum Random Number Generators                          |
| Giuseppe Viola           | Entanglement Witnessing with Untrusted Detectors  |

# QUANTUM SPEEDUP

December 5th-8th, 2022, Gdańsk

|                          |   |
|--------------------------|---|
| Jan Nowosielski          | Fractional Fourier transform in gradient echo memory  |
| John Selby               | Generalised process theories  |
| Julia Chupryna           | Breadboard for optical satellite telemetry ranging  |
| Karol Łukanowski         | Quantum Limits on the Capacity of Multispan Links with Phase-sensitive Amplification  |
| Karthi Hosapete Seshadri | Noise-adapted strategies for quantum random access codes  |
| Kaushik Joarder          | Ultrabright Sagnac-type source for satellite quantum communication  |
| Marcin Jastrzębski       | How to experimentally rotate the Wigner function of a pulse?  |
| Marcin Łobejko           | Towards reconciliation of completely positive open system dynamics with the equilibration postulate   |
| Marcin Marciniak         | On some generalization of Gleason theorem   |
| Marcin Pawłowski         | Extending loophole-free nonlocal correlations to arbitrarily large distances  |
| Marcin Wieśniak          | Two-Qutrit Entanglement: 56 years old algorithm challenges machine learning   |
| Marek Winczewski         | On the exponential quantum dynamical maps with the relaxation property  |
| Markus Grassl            | How Much Entanglement Does a Quantum Code Need?   |
| Michał Banacki           | Security in scenarios of post-quantum channel steering  |
| Michał Cholewiak         | Two approaches to Zauner Conjecture   |
| Paulo Cavalcanti         | Representing all multipartite non-signalling channels via quasiprobabilistic mixtures of local channels in generalised probabilistic theories |
| Paweł Mazurek            | The asymptotic emergence of the Second Law for a repeated charging process  |
| Piotr Mironowicz         | Entangled Rendezvous: A Possible Application of Bell Non-Locality For Mobile Agents on Networks   |
| Saronath Halder          | Quantum vs classical: identifying the value of a random variable unambiguously  |
| Sumit Rout               | Arbitrary Separation in One-way Zero-error Quantum Communication Complexity of Relations with Finite Set of Inputs                            |
| Susane Calegari          | Fermion Sampling under realistic assumptions  |
| Wojciech Bruzda          | Local Hidden Variable Values Without Optimization Procedures  |

## Committees

### Advisory Committee

**Konrad Banaszek** (QOT, UW)  
**Marek Kuś** (CTP, PAN)  
**Marcin Marciniak** (WMFil, UG)  
**Marek Żukowski** (ICTQT, UG)  
**Karol Życzkowski** (KCIK, UG / UJ)

### Steering Committee

**Paweł Horodecki** (ICTQT, UG)  
**Michał Parniak** (QOT, UW)  
**Ana Belen Sainz** (ICTQT, UG)

### Organising Committee

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**Ewa Kaszewska** (ICTQT, UG)  
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